

METHOD AND APPARATUS FOR OBTAINING IMAGE

BACKGROUND

[0001] 1. Technical Field

[0002] The exemplary and non-limiting embodiments relate generally to digital image creation and, more particularly, to improving the quality of images taken using a rolling shutter image sensor.

[0003] 2. Brief Description of Prior Developments

[0004] Digital images are created using pixel sensors that convert light energy into an electrical signal. Most common image sensors have pixel sensors arranged in rows and columns and have associated electrical circuitry. The circuitry reads out the electrical signals from which an image can be formed. When a flash is used the quality of the image can be impaired. Different methods have been used to prevent or correct the image created using a flash. One method that has been used is to combine two images, one with flash and one without flash. Various methods of this type generally do not generate a quality image because of latency involved in the capture, take too long or use too much memory.

SUMMARY

[0005] The following summary is merely intended to be exemplary. The summary is not intended to limit the scope of the claims.

[0006] In accordance with one aspect, an example method comprises reading out first lines of pixels of a sensor, where the first lines are read out in a sequence of the first lines in a first direction along the sensor, reading out different second lines of the pixels of the sensor, where the second lines are read out in a sequence of the second lines in a different second direction along the sensor and interleaving the read outs from the first lines of pixels and the second lines of pixels.

[0007] In accordance with another aspect, an example apparatus comprises at least one processor, and at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to generate data read out from first lines of pixels of a sensor, where the first lines are read out in a sequence of the first lines in a first direction along the sensor, read out different second lines of the pixels of the sensor, where the second lines are read out in a sequence of the second lines in a different second direction along the sensor, and interleave the data read out from both the first lines of pixels with the different second lines of pixels.

[0008] In accordance with another aspect, an example non-transitory program storage device readable by a machine is provided, tangibly embodying a program of instructions executable by the machine for performing operations, the operations comprising: reading out first lines of pixels of a sensor, where the first lines are read out in a sequence of the first lines in a first direction along the sensor, reading out different second lines of the pixels of the sensor, where the second lines are read out in a sequence of the second lines in a different second direction along the sensor; and interleaving the read outs from the first lines of pixels and the second lines of pixels.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The foregoing aspects and other features are explained in the following description, taken in connection with the accompanying drawings, wherein:

[0010] FIG. 1 is a front view of an example embodiment of an apparatus comprising features as described herein;

[0011] FIG. 2 is a rear view of the apparatus shown in FIG. 1;

[0012] FIG. 3 is a block diagram illustrating some of the components of the apparatus shown in FIGS. 1-2;

[0013] FIG. 4 is a schematic diagram illustrating pixels in lines of a sensor;

[0014] FIG. 5 is a partial timing diagram for the sensor shown in FIG. 4 of some of its lines of pixels;

[0015] FIG. 6 is another partial timing diagram for the sensor shown in FIG. 4 of some other ones of the lines of pixels; and

[0016] FIG. 7 is a schematic diagram of an image formed by interleaving data from rows of the first and second lines of pixels; and

[0017] FIG. 8 is a diagram illustrating an example method.

DETAILED DESCRIPTION OF EMBODIMENTS

[0018] Referring to FIG. 1, there is shown a front view of an apparatus 10 incorporating features of an example embodiment. Although the features will be described with reference to the example embodiment shown in the drawings, it should be understood that features can be embodied in many alternate forms of embodiments. In addition, any suitable size, shape or type of elements or materials could be used.

[0019] The apparatus 10 may be a hand-held portable apparatus, such as a communications device which includes a telephone application for example. In the example shown the apparatus 10 is a smartphone which includes a camera and a camera application. The apparatus 10 may additionally or alternatively comprise an Internet browser application, a video recorder application, a music player and recorder application, an email application, a navigation application, a gaming application, and/or any other suitable electronic device application. In an alternate example embodiment the apparatus might not be a smartphone. For example, the apparatus might be a SLR type of camera.

[0020] Referring also to FIGS. 2-3, the apparatus 10, in this example embodiment, comprises a housing 12, a touchscreen 14, a receiver 16, a transmitter 18, a controller 20, a rechargeable battery 26 and a camera 30. However, all of these features are not necessary to implement the features described below. The controller 20 may include at least one processor 22, at least one memory 24, and software 28. The electronic circuitry inside the housing 12 may comprise at least one printed wiring board (PWB) having components such as the controller 20 thereon. The receiver 16 and transmitter 18 form a primary communications system to allow the apparatus 10 to communicate with a wireless telephone system, such as a mobile telephone base station for example.

[0021] In this example, the apparatus 10 includes the camera 30 which is located at the rear side 13 of the apparatus, a front camera 32, an LED 34, and a flash system 36. In one type of alternate example embodiment more than one camera could be provided at the rear side 13. The LED 34 and the flash system 36 are also visible at the rear side of the apparatus, and are provided for the camera 30. The cameras 30, 32,